

WHAT IS CLAIMED IS:

1 *Sub* An apparatus providing equipment and facility  
2 redundancy, comprising:

3 working circuitry configured to receive a first  
4 stream of communication data;

5 protection circuitry configured to receive a  
6 second stream of communication data, the second stream  
7 being identical to the first stream, the protection  
8 circuitry and the working circuitry being functionally  
9 identical and synchronized to each other; and

10 a cross point switch configured to select from  
11 one of the first stream and the second stream and further  
12 configured to select and substitute the second stream for  
13 the first stream upon detection of an error condition in  
14 at least one of the working circuitry and the first  
15 stream of communication data.

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1           2.     The apparatus of claim 1, wherein the  
2     communication data is ATM cells data.

1           3.     The apparatus of claim 1, wherein the working  
2     circuitry receives the first stream from an optical  
3     signal and the protection circuitry receives the second  
4     stream from the optical signal.

1           4.     The apparatus of claim 1, wherein the working  
2     circuitry is implemented on a first circuit board and the  
3     protection circuitry is implemented on a second circuit  
4     board, the first circuit board being separate and  
5     distinct from the second circuit board.

1           5.     The apparatus of claim 1, wherein the working  
2     circuitry includes a plurality of first ATM channels  
3     performing ATM functions on the first stream and the  
4     protection circuitry includes a plurality of second ATM

5 channels performing the ATM functions on the second  
6 stream.

1 6. The apparatus of claim 5, wherein one of the  
2 first ATM channels and one of the second ATM channels  
3 each include a multiplexer.

1 7. The apparatus of claim 5, wherein one of the  
2 first ATM channels and one of the second ATM channels  
3 includes a SONET framer.

1 8. The apparatus of claim 5, wherein one of the  
2 first ATM channels and one of the second ATM channels  
3 includes a router.

1 9. The apparatus of claim 5, wherein one of the  
2 first ATM channels and one of the second ATM channels  
3 includes a user parameter control unit.

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1           10. The apparatus of claim 1, further comprising:  
2           a first module including the working circuitry  
3           and having a plurality of ports wherein one of the ports  
4           accepts the first stream as input to the working  
5           circuitry.

7           11. The apparatus of claim 1, further comprising:  
8           a second module including the protection  
9           circuitry and having a plurality of ports wherein one of  
10          the ports accepts the second stream as input into the  
11          protection circuitry.

1           12. The apparatus of claim 1, further comprising:  
2           an ATM switch fabric having a plurality of  
3           input ports, a plurality of output ports, and configured  
4           to transfer an ATM cell from one of said plurality of  
5           input ports to anyone of said plurality of output ports,  
6           said ATM cell being received from said working circuitry  
7           as part of said first stream.

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1           13. The apparatus of claim 1, further comprising:  
2           an ATM switch fabric having a plurality of  
3           input ports, a plurality of output ports, and configured  
4           to transfer an ATM cell from one of said plurality of  
5           input ports to anyone of said plurality of output ports,  
6           said ATM cell being received from said protection  
7           circuitry as part of said second stream.

1           Sub 14 The apparatus of claim 12, further comprising:  
2           a second cross point switch configured to  
3           receive ATM cells from one of the plurality of output  
4           ports of the ATM switch fabric and to direct the received  
5           ATM cells to one of an output portion of a second working  
6           circuitry and an output portion of a second protection  
7           circuitry.

1           15. The apparatus of claim 1, wherein the error  
2           condition is a facility error condition.

1           16. The apparatus of claim 15, wherein the facility  
2 error condition includes a disconnected cable.

1           17. The apparatus of claim 1, wherein the error  
2 condition is an equipment error condition.

1           18. The apparatus of claim 17, wherein the  
2 equipment error condition includes at least one of a  
3 failure of a SONET Framer a failure of a multiplexer, a  
4 failure of a parameter control unit, and a failure of a  
5 router.

1           <sup>Sub 18</sup><sub>AB</sub> A method providing equipment and facility  
2 redundancy for ATM circuitry which carries out ATM  
3 functions, comprising:

4           performing a group of ATM functions with first  
5 circuitry on a first stream of ATM cells producing a  
6 processed first stream;

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7 performing the ATM functions with second  
8 circuitry on a second stream of ATM cells producing a  
9 processed second stream, the second stream being  
10 identical to the first stream, the first circuitry and  
11 the second circuitry implementing the ATM functions, the  
12 first circuitry and the second circuitry being  
13 synchronized to each other; and

14 substituting the second processed stream for  
15 the first processed stream for input to a designated port  
16 of an ATM switch upon detection of an error condition in  
17 the first circuitry, the first processed stream having  
18 initially been selected for input to the designated port  
19 of the ATM switch, thereby providing redundancy  
20 protection for the ATM functions.

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1 20. The method of claim 19, wherein the ATM  
2 functions include at least one of multiplexing, SONET  
3 framing, routing, and user parameter control.

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1        ~~21.~~ A method providing equipment and facility  
2        redundancy for ATM circuitry, comprising the steps of:  
3                receiving a first stream of ATM cells;  
4                forming a second stream of ATM cells identical  
5        to the first stream of ATM cells;  
6                detecting an error condition associated with  
7        the first stream; and  
8                switching from the first stream to the second  
9        stream upon detection of the error condition.

1        ~~22.~~ A method of providing equipment and facility  
2        redundancy of ATM circuitry, comprising the steps of:  
3                using a crosspoint switch to duplicate ATM  
4        calls; and  
5                using said crosspoint switch to send redundant  
6        cells to two different paths.